Rethinking the orientational prefixes in Rgyalrongic languages: The case of Siyuewu Khroskyabs

Lai, Yunfan; Wu, Mei-Shin; List, Johann-Mattis

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Yunfan Lai*

with contributions by Mei-Shin Wu and Johann-Mattis List**

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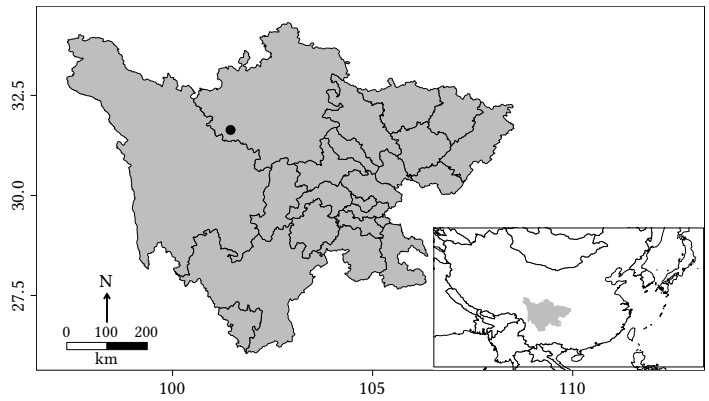
1 Background Information

1.1 Rgyalrongic languages

- Rgyalrongic is a group of Burmo-Qiangic languages in the Sino-Tibetan family mainly spoken in Western Sichuan, including Rgyalrong languages (Situ, Tshobdun, Japhug and Zbu), Horpa languages and Khroskyabs dialects (Sun, 2000b,a).
- Figure 1 shows the location of the languages under analysis.
- These languages are highly complex both phonologically and morphologically.
- Verbal morphology in Rgyalrongic, in particular, exhibits extraordinary affixation and various morphological processes.

*Computer-Assisted Language Comparison (CALC), Department of Linguistic and Cultural Evolution, Max Planck Institute for the Science of Human History

Figure 1: Location of Rgyalrongic languages



1.2 Orientational prefixes in Rgyalrongic languages

- Burmo-Qiangic languages: "orientational prefixes" or "directional prefixes" (LaPolla, 2017).
- Two major functions
  - Indicating the directions to which the action denoted by the verb (if applicable)
  - Lexically assigned to verb stems to indicate TAME properties.

1.3 Goal of the paper

This paper will focus the first function of orientational prefixes in one of the Rgyalrongic languages, namely Siyuewu Khroskyabs, by re-examining the traditional approaches and providing an alternative way to analyse them.

2 Khroskyabs dialects

- Khroskyabs (previous known as Lavrung) is identified as a separate language by Huang (2001).
- Works dedicated to different dialects include Huang (2007) (Guanyinqiao), Yin (2007) (Njorogs), Lai (2013, 2017) (Wobzi), etc.
- Siyuewu, the target language of this paper, is a variety of Khroskyabs that has never been studied before.

3 Classical approaches to the study of orientational prefixes

- Traditional analyses rely on actual topography
- Towns and villages are typically separated by a river in the middle, while being sandwiched by mountains.

Figure 2: Topography of Thugs.chen

- As a result, scholars have been trying hard to find absolute correlations between the uses of orientational prefixes and the actual geography. LaPolla (2017, 49) mentions several reference systems related to orientational prefixes, summarised in 1.

(1)
1. Relative: upward, downward; inward, outward; towards the speaker, away from the speaker
2. Riverine: upstream, downstream
3. Mountain related: towards the mountain, away from the mountain
4. Solar: eastward, westward, northward, southward

- Such a qualitative approach can cause problems.
- There can exist several different interpretations, according to the scholar's subjective opinion.
- For instance, the pair of orientational prefixes ***ko-*** and ***nə-*** in Cogtse Rgyalrong have been studied by several authors, holding completely different opinions about the actual meanings.
  - Nagano (1984) holds that the two prefixes indicate higher and lower seats in a house.
  - Lín (1993) proposes that they indicate upstream and downstream.
  - while Lin (2002) claims that the directions should be eastwards and westwards.
- The three authors must have their own reason to make their conclusions, however this simple example shows us that qualitative studies basing on educated guesses are not always reliable and may cause confusions. We should therefore find another way out.

4 Orientational prefixes in Khroskyabs

- Table 1 shows the orientational prefixes in Siyuewu Khroskyabs and the directions they indicate according to the traditional approach.
- Except the two prefixes, *rə-* and *æ-*, that indicate undetermined directions, all the other prefixes come in pairs.
- In each pair, the direction indicated by one prefix must be the opposite direction indicated by the other prefix.
- The glosses in Table 1 cannot cover all the uses that are associated to each prefix. For example, *kə-* and *nə-* can indicate left and right facing the river within a limited distance.

Table 1: Orientational prefixes in Siyuewu

Prefixes	Directions
o-	upward
næ-	downward
kə-	dark side of mountain
nə-	sunny side of mountain
læ-	upstream
və-	downstream
rə-	undetermined
æ-	undetermined

- In order to show dialectal variance, Table 2 shows the orientational prefixes and their meanings in the Wobzi dialect.
- We can see that the Wobzi orientational prefixes are mostly cognates of the Siyuewu ones, however their meanings are quite different. For instance, the pair *læ* and *və-*, meaning "upstream" and "downstream" in Siyuewu, indicate "left bank" and "right bank" in Wobzi.

Table 2: Orientational prefixes in Wobzi

Prefixes	Directions
æ-	upward
næ-	downward
kə-	upstream
nə-	downstream
læ-	toward the left bank, or a higher altitude
və-	toward the right bank, or a lower altitude
rə-	undetermined

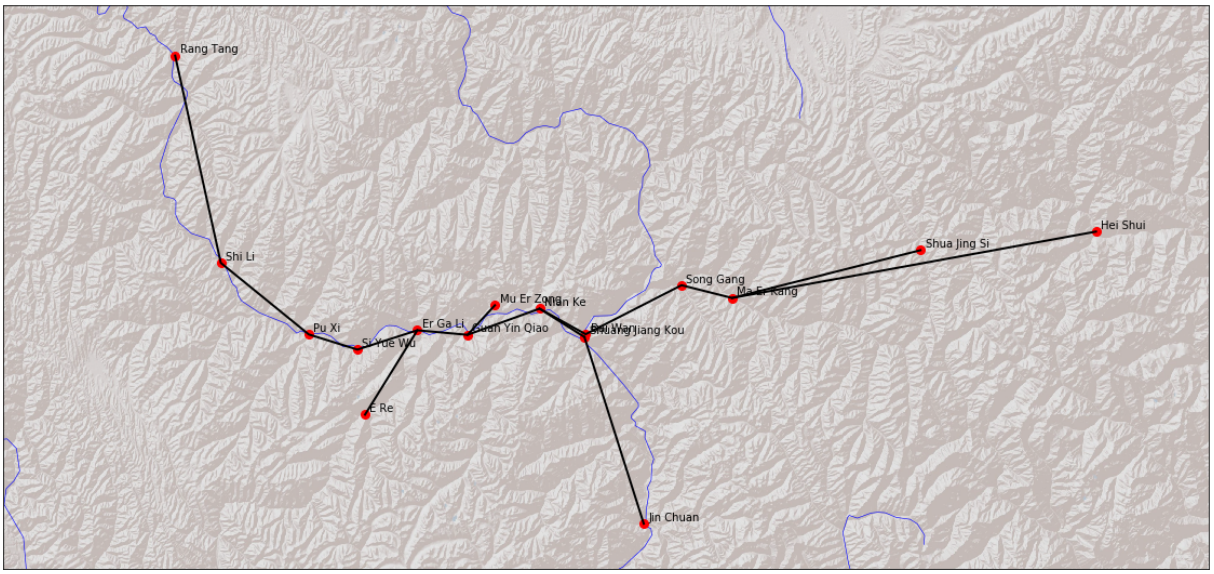
5 Observations

- We cannot deny that the spatial function is somewhat related to actual topography.
- But it is highly doubtful that the spatial function fully matches the geographical reality.
  - Significant dialectal variance has been found in Khroskyabs dialects.
  - Even in the same dialect, there are unpredictable uses.
- It is rare that a modern language exhibits highly regular linguistic patterns, there should be innovation and analogy.
- It is more reasonable to say that the spatial functions of orientational prefixes are only partly related to actual topography.
- There are productive uses that are closer related to the actual geographical situation.
- There are also fossilised uses that are not explicable from a synchronic perspective.
- There may be several historical layers of evolution.
- Our current study is to evaluate to what extend the current orientational prefix system correlates with actual topography.

6 A computer-assisted approach

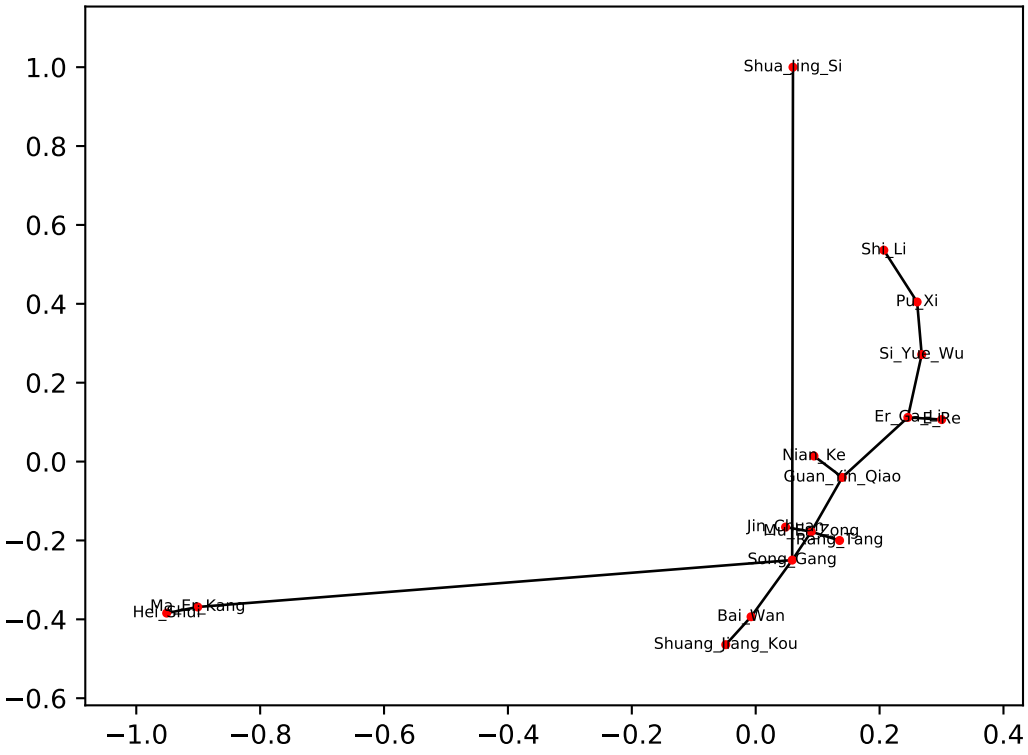
- Forget about naming the reference systems, and embrace an agnostic attitude towards the orientational prefixes.
- Build a matrix with all the orientational relations among the places only according to **the language**.
- Draw a map based on the matrix, reflecting the **collective memory** of the geography.
- Compare this **collective map** to the actual map.
- The 15 places selected: Rangtang, Shili, Puxi, Siyuewu, Ergali, Ere, Guanyinqiao, Muerzong, Baiwan, Shuangjiangkou, Jinchuan, Songgang, Maerkang, Shuajingsi, and Heishui.
  - Given that the specific topography of Khroskyabs speaking areas, there is generally only one way to go from one place to another.
  - The combination of paths on the map has a spanning tree structure, as shown in Figure 3.

Figure 3: Spanning tree of the actual map



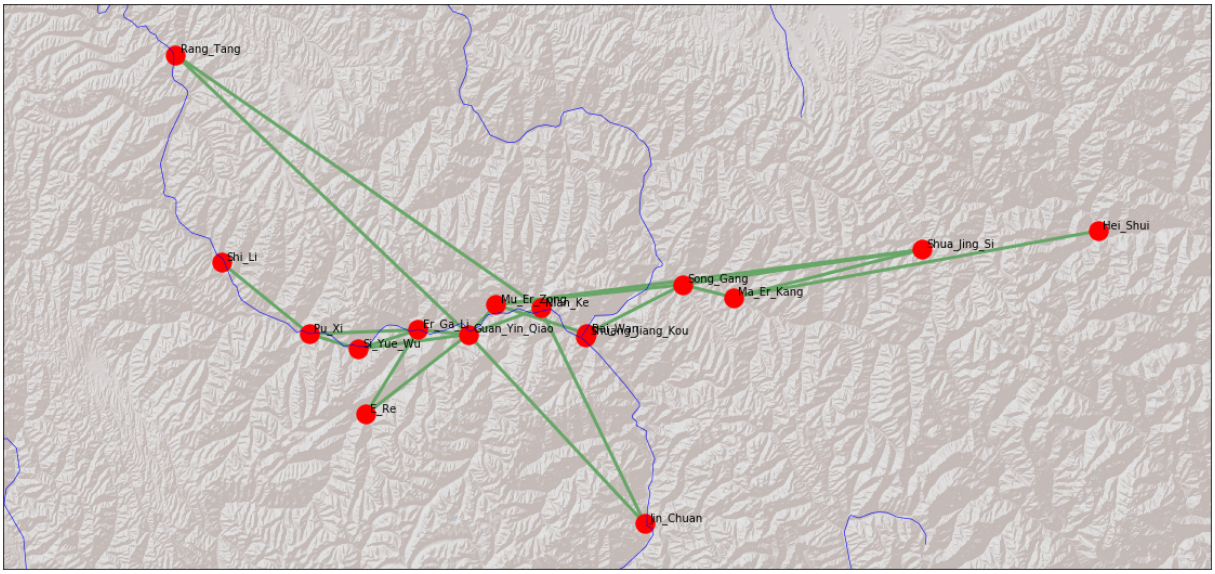
- The human brain tends to simplify complex informations (Kroll et al., 2010, 201).
- We hypothesise that the collective map should be the simplese version(s) of all the spanning trees that can be generated in the actual map.
- We need to find the minimal spanning tree(s) (Kruskal, 1956; Prim, 1957).
- Assign a weight to each successive combination of prefixes according to the degree of their mutual difference.
- The greater the difference is, the heavier the weight should be assigned.
  - The two prefixes in the same pair indicate opposite directions, the combination of these two prefixes should be greater than that of any other combination.
    - **Assign 3 points.**
  - If a combination has two identical prefixes:
    - **Assign 0 points.**
  - Otherwise
    - **Assign 1 point.**
- Using our Python code, we can generate minimal spanning trees as shown in Figure 4.

Figure 4: A generated tree



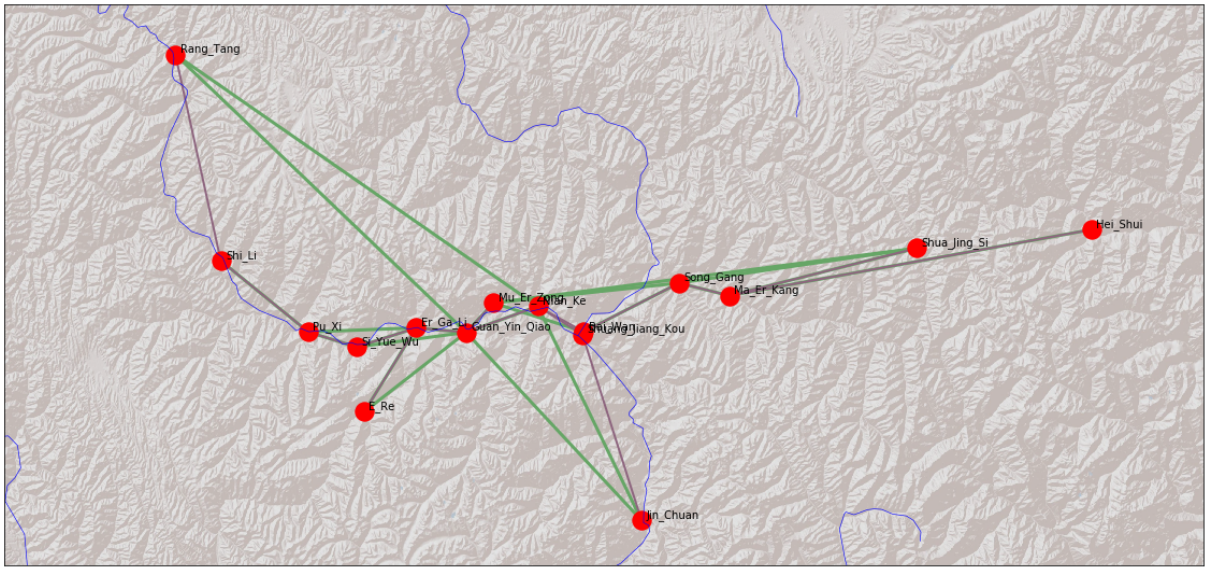
- There is not only one minimal spanning tree, so if we have all the minimal spanning trees together, we will obtain a minimal spanning network, as shown in Figure 5, adjusted to fit the actual map. We can see there are already discrepancies with the actual topography.

Figure 5: The inferred minimal network



- Now we can put the actual tree and the inferred network together, as shown in Figure 6, and we can easily see the difference.
- The inferred network predicts well in terms of the main trunk of the actual tree, mainly the area where the Khroskyabs language is spoken.
- It is inaccurate in terms of the relatively remote areas, which are also not Khroskyabs speaking regions.

Figure 6: Comparison of the two trees



Author Contributions

YFL initiated the study, collected the data from original field research, and wrote the first draft. JML designed the network analysis and wrote the initial Python code. Mei-Shin Wu designed the geographic maps. All authors revised the draft and agree on its final version.

Data and Code

Data and code are under heavy construction and may change drastically during the next time. However, for those interested in our initial implementations, you can check them out at GitHub under https://github.com/digling/orientational-prefixes. We kindly ask all people interested in using parts of the code or the data for their own studies to contact us before you submit any papers on it, so that we can make sure to give you proper instructions on how to quote our data and code, and also submit a draft version to a stable archive to guarantee that the data will be long-term archived.

Acknowledgements

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